

Spatial Information Metadata Guidelines

Part of Victoria's Spatial Information Management Framework

The Victorian Spatial Council was established under the Victorian Spatial Information Strategy 2004-2007 to support the advancement of Victoria's social, economic and environmental goals through the provision and application of spatial information. It does this by providing a coordinated approach to spatial information policy, development and management, and facilitating opportunities for greater partnership building, collaboration, cooperation and education.



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VSC CHAIRMAN'S FOREWORD

The Victorian Spatial Information Management Framework consolidates the policies, principles and guidelines for information management that were articulated by both the Victorian Geospatial Information Strategy 2000-03 and the Victorian Spatial Information Strategy 2004-07.

The Framework aims to support the effective use of spatial information to support Victoria's social, environmental and economic goals through the establishment of institutional arrangements for developing spatial information; creating and maintaining spatial information; making spatial information accessible and available; and strategic development of technology and applications.

The custodian of spatial information is at the heart of the Spatial Information Management Framework. Its policies set out the minimum requirements for custodians to manage their datasets, while a set of underlying principles provide the foundation for enabling them to maintain these datasets and ensure all Victorians are aware of and have ready access to them.

These principles address all elements of the Spatial Data Infrastructure of Victoria: *governance, custodianship, framework information, business information, quality, metadata, awareness, access, pricing and licensing, and privacy.*

The Framework is accompanied by ten Guideline documents to assist custodians in the implementation of these policies and principles. These *Spatial Information Metadata Guidelines* provide an introduction to Victoria's approach to metadata: how it is defined, how it is managed, what it comprises, and how it may be sourced and used.

The Guideline documents are also intended to be accessible to the general reader by setting out fully the basis on which the Framework will be delivered.

The Victorian Spatial Council is Victoria's principal coordinating body for spatial information, with a mandate to develop policy and promote best practice for spatial information management. These *Metadata Guidelines* are a key contributor to the Spatial Information Management Framework's objective to make spatial information accessible and useable. It is intended that they will be informed by practical experience, and contributions to future editions are welcome from practitioners and readers alike.



Olaf Hedberg

Chair, Victorian Spatial Council

INTRODUCTION

The Spatial Information Management Framework

The Spatial Information Management Framework is Victoria's best practice approach for establishing and retaining consistency in the management of spatial information across all organisations – whether public or private – with a role or interest in doing so.

Its objective is that spatial information be made as accessible as possible.

The Victorian Spatial Council has endorsed the development of the Framework because a coordinated approach to information management will provides the greatest opportunity to:

- reduce duplication of datasets, systems and processes, and increase consolidation, leading to more efficient spending on spatial information
- optimise investment and develop partnerships across the spatial information community (public, private and academic sectors)
- deliver higher quality datasets
- improve access to spatial information

Management of spatial information by participants in the Framework should facilitate its effective use, based on four key principles: that the spatial information will:

- represent the definitive and authoritative source of the data it contains
- be managed by designated custodians
- be accessible and available to all members of the community, except where confidentiality and commercially sensitive conditions apply
- be able to be combined with other spatial information products for the purposes of analysis and decision making

The Spatial Information Management Framework provides a holistic approach to managing spatial information in Victoria, encompassing the

1. **institutional arrangements for developing spatial information;**
2. requirements for **creating and maintaining spatial information;**
3. mechanisms for **making spatial information accessible** and available; and
4. **strategic development of technology and applications.**

Together, these components of the Framework create Victoria's Spatial Data Infrastructure (SDI).

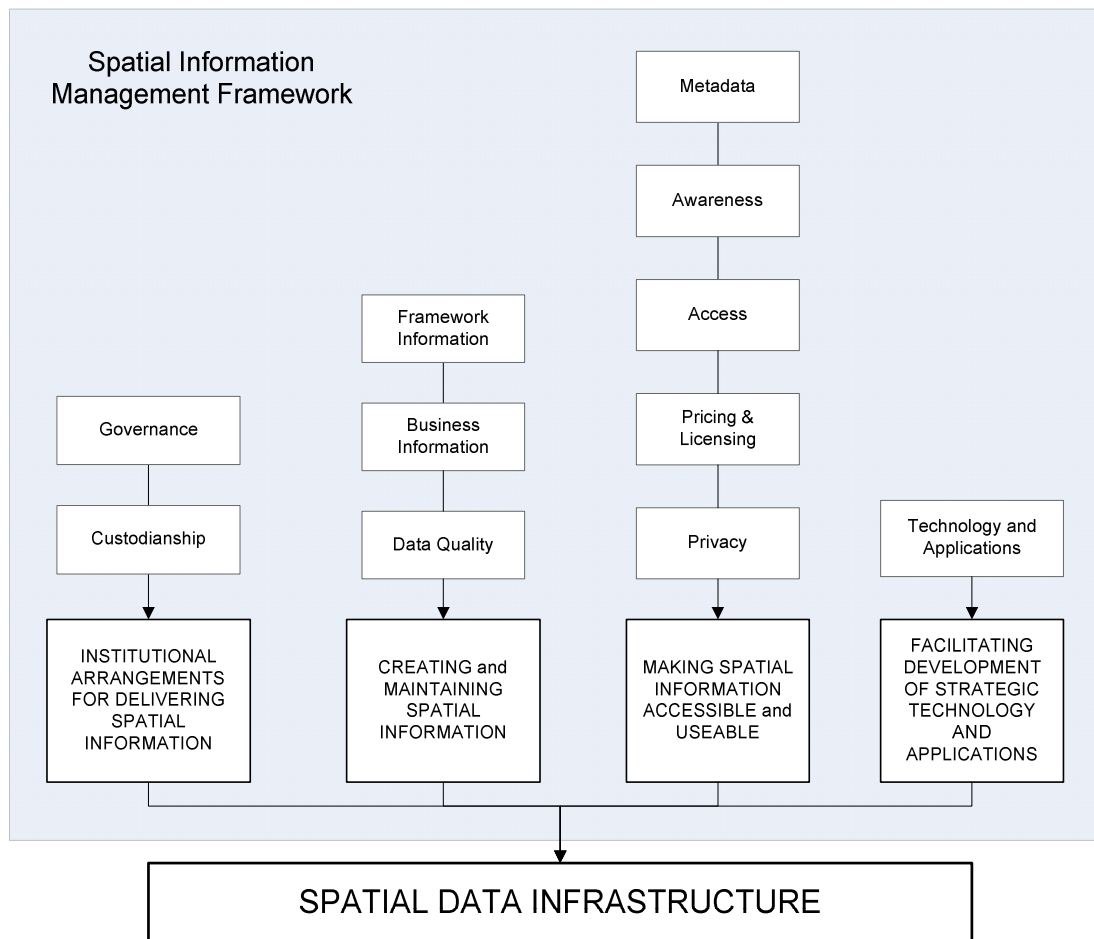
The SDI is an enabler – a mechanism for making data available and for sharing and exchanging it to enhance the achievement of social, environmental and economic goals. Behind it are the myriad of activities that create the conditions in which that sharing and exchange can take place, ie the development of the data, technology, policies, institutional arrangements and capacity building (ie equipping people to use the technology and information).

The Framework allows for the management of these elements in an integrated way to provide an environment for the effective use of spatial information.

This integrated approach is illustrated in Figure 1.

The Framework is supported by policies and guidelines that provide the formal requirements for implementing it, and tools and resources to support those responsible for that task.

Figure 1: The Victorian Spatial Information Management Framework



Separate Guidelines have been prepared for the following components of the Framework:

- Governance
- Custodianship
- Framework Information
- Business Information
- Data Quality
- Metadata
- Awareness
- Access
- Pricing and Licensing
- Privacy

The purpose of the Guidelines is to explain the policies and principles outlined in the relevant component of the Framework, and to describe activities that will support their application in implementing it.

It is envisioned that these Guidelines will vary over the life of the Framework as new information, policies, and procedures are developed, and as new issues arise.

This Document

It is intended that the Guidelines be read in conjunction with the document '*Victoria's Spatial Information Management Framework and Directory of resources*', also produced by the Victorian Spatial Council.

These Metadata Guidelines have two sections.

- Part A provides background on metadata and its place in Victoria's Spatial Information Management Framework.
- Part B presents the guidelines for metadata.

The document also includes a series of five Appendixes that provide additional detailed information on metadata management and metadata standards, together with a glossary of terms

PART A

Background

Victoria's Spatial Information Management Framework is based on a key set of principles to ensure that spatial data and other spatial resources are available, accessible and useable. Metadata is one of the core elements of the Framework.

An organisation's information and services are valuable assets and a substantial amount of time, money and effort is invested in these assets. However, if potential users are unable to readily locate the information and services they seek, then the full value of those resources will not be realised. Standard resource descriptions ('metadata') conforming to an accepted standard, can be applied to each asset to help people or applications find what they need amidst the vast amount of information available.

The guidelines that follow are intended to facilitate the effective implementation of the metadata component of Victoria's Spatial Information Management Framework

Metadata is structured information that describes information or services. The information in the metadata enables people to find, manage, control, understand and preserve their data assets. A metadata standard improves the discoverability, utility and management of resources by adopting standard and structured descriptions, enabling organisations to improve the visibility and accessibility of their resources.

A metadata standard is a key component of an organisation's information management. By investing time and effort to provide quality and consistently structured metadata, organisations can significantly increase the return on investment of their assets.

What is Metadata?

Metadata is defined as "data about data". Metadata is structured information that describes data, information, services or other resources. The information in the metadata enables people to find, manage, control, and understand their data assets and other resources.

Metadata is the key management mechanism for Victoria's spatial information environment. Metadata provides fundamental information management tools at three levels:

- Discovery: enabling users to locate and evaluate information.
- Management: enabling custodians to better manage their spatial information.
- Utilisation: enabling users to access and manipulate information by means of automated / distributed systems.

Metadata for spatial information is required for a range of purposes. It is used to provide, among other things:

- detailed information about data collection methods, integration and analysis techniques applied to various components of source data to support the preparation of scientific reports;
- information about the accuracy of source datasets, processing history, and archival procedures to effectively manage and utilise data within custodian organisations;

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- information about projection specifications, scale, and a data dictionary to accompany data transfers to other organisations;
- adequate descriptions of the content, quality and geographic extent of datasets so potential users of existing data can assess its suitability for their purposes; and
- summary descriptions of content and quality as well as contact information for inclusion in directory systems.

Metadata provides the content for the Victorian Spatial Data Directory (VSDD), and specifies the links and access conditions for the distributed clearinghouses. Users can locate, evaluate and acquire information by using metadata. Custodians will document and manage their spatial information (quality, currency, pricing, and access constraints) by using metadata. Automated/distributed systems will locate, access and manipulate information by using metadata.

PART B

GUIDELINES

1 Creation and Maintenance of Metadata

- 1.1 Each organisation will ensure that metadata is created and maintained as an integral part of the development and management of datasets and associated products.**

The importance and usefulness of metadata is now widely recognised. Rather than being left as an afterthought, or not being done at all, the preparation of metadata as an integral part of development of datasets has become standard "best practice". Continuing maintenance of the metadata is of equal importance. Metadata focuses on the needs of potential users of data and contributes to good business practice and asset management.

A checklist that can be used to help an organisation identify what is needed to create metadata is given Appendix 1.

2 Metadata Standards

- 2.1 All metadata for spatial data and resources shall comply with the ANZLIC Metadata Profile (version 1.1, August 2007) or, as an interim alternative, the predecessor ANZLIC Metadata Guidelines (version 2, February 2001).**

A new International Standard for spatial metadata has recently been developed and adopted within Australia and New Zealand, and ANZLIC has developed the ANZLIC Metadata Profile (version 1.1, August 2007) to ensure a consistent approach to the use of the new metadata standard. ANZLIC is also progressively developing a range of resources to help with the creation of metadata that complies with the ANZLIC Metadata Profile (see ANZLIC web site <http://www.anzlic.org.au> for copies of the Profile and other resources).

The metadata strategy that was presented in the Victorian Geospatial Information Strategy 2000-2003 (VGIS) was based on the ANZLIC Metadata Guidelines: Core metadata elements for geographic data in Australia and New Zealand (version 2, February 2001). Many existing metadata records and systems comply with this earlier standard. ANZLIC has developed a "mapping" from the metadata elements specified in the ANZLIC Metadata Guidelines (version 2, February 2001) to the elements specified in the ANZLIC Metadata Profile (see ANZLIC web site <http://www.anzlic.org.au> for details). This mapping can be used to transform existing metadata records into the format that complies with the ANZLIC Metadata Profile.

ANZLIC has also developed a mapping between the ANZLIC Metadata Profile and the AGLS standard (see ANZLIC web site <http://www.anzlic.org.au> for details), and it is possible to use this mapping to create AGLS metadata from ANZLIC metadata.

Further information on metadata standards is given in Appendix 2.

3 Levels of Metadata

3.1 Organisations should collect at least the core metadata elements for datasets as specified in the ANZLIC Metadata Profile (version 1.1, August 2007), or as an interim alternative, the core (“Page 0”) metadata elements as defined in the ANZLIC Metadata Guidelines (version 2, February 2001).

The core metadata elements are specified in the ANZLIC Metadata Profile (version 1.1, August 2007) in “Table 2 – Core metadata for geographic datasets”. For ease of reference, relevant extracts from the Profile are given in Appendix 3.

Table 2 of the Profile lists the core metadata required to describe a dataset, typically for catalogue purposes. This list contains metadata answering the following questions:

- ‘Does a dataset on a specific topic exist (“what”)?’
- ‘For a specific place (“where”)?’
- ‘For a specific date or period (“when”)?’
- ‘A point of contact to learn more about or order the dataset (“who”)?’

By using the core metadata recommended in the Profile, interoperability will be enhanced, allowing users to understand without ambiguity the geographic data and the related metadata provided by either the producer or the distributor.

The ANZLIC Metadata Guidelines (version 2, February 2001) specified the core elements in “Chapter Three – ANZLIC Core Metadata Elements”. For ease of reference, relevant extracts from Chapter 3 are given in Appendix 4.

3.2 In the interests of increasing the value and usefulness of their metadata records, organisations are encouraged to collect additional optional metadata elements that are specified in the ANZLIC Metadata Profile (version 1.1, August 2007),

Additional metadata elements specified in the Profile allow users to more clearly evaluate the characteristics of spatial datasets. The additional metadata can also be of use for data management purposes.

4 Metadata to Accompany Data Transfer

4.1 Organisations will include at least the core metadata set out in 3.1 with the transfer of all spatial information. Organisations are encouraged to also include any additional metadata elements that may exist.

Metadata helps ensure that potential users of data are aware of its limitations and of its suitability for use. It also helps to maximise the value of the data. The inclusion of metadata with data transfer is now established as a part of "best practice" data supply.

5 Availability of Metadata

5.1 Core metadata elements must be made readily available at no cost.

It is in the interests of both data custodians and data users that metadata is readily available and accessible.

In 1994, ANZLIC adopted a policy on the Transfer of Metadata. The 1994 ANZLIC Policy was adopted by Victoria and the other jurisdictions that were party to that agreement. The Policy is intended to apply to the highest summary level of metadata (called "core metadata") used in directory systems at the jurisdiction and at the national level, and not necessarily to all metadata. The 1994 ANZLIC Policy includes the following provisions:

- *jurisdictions will contribute core metadata to the national directory at no cost;*
- *core metadata will be made available from the national directory to contributing jurisdictions at no cost;*
- *mechanisms should be established by jurisdictions to allow any potential user to access core metadata freely and readily. This does not preclude the development of "add on" services on a fee-for-service basis.*

5.2 Additional metadata, where it exists, should be made readily available at no cost.

The new standard and the ANZLIC Metadata Profile provide data custodians not only with the basis for core metadata required for "discovery" purposes but also with the basis for richer, more detailed metadata of great value for data management purposes. The richer metadata will also assist potential users to determine the characteristics and limitations of datasets, and wherever possible should be made freely available.

6 Organisation Data Directories

6.1 Each organisation must ensure that there is a clearly identified authoritative version of each of the data directories it maintains.

It is critical that a master version of each data directory is maintained as the single authoritative source of metadata. To minimise overlaps and duplication, management of the master version should be closely controlled by the organisation.

6.2 Organisations should establish procedures to ensure that directories of existing data are interrogated prior to expenditure of funds on data collection.

Spatial information in Victoria can be used for a variety of different purposes. Each organisation could individually collect the data it needs, but this could lead to costly data duplication and inconsistencies between datasets. Given that each organisation collects specific information for which it has a particular high level of expertise, it is more cost-effective and efficient if organisations share that information and avoid duplication of effort and creation of inconsistent data.

Before an organisation can use information from another organisation it must know that the information exists. This is a function of metadata. By examining metadata in its own or other organisations' data directories, an organisation can determine if information suitable for its needs already exists and is available. It may also help point the way to possible cost sharing, co-operative ventures to collect new data or to convert or upgrade existing data.

7 Victorian Spatial Data Directory

7.1 Custodial organisations wishing to have metadata included in the Victorian Spatial Data Directory will collect the core metadata elements. The custodial organisations will provide the metadata for all the available spatial information for which the organisation is the custodian to Spatial Information Infrastructure, DSE, for inclusion in the Victorian Spatial Data Directory.

As a participant in ANZLIC, Victoria has been collaborating with other States and Territories in establishing the Australian Spatial Data Infrastructure. One of the aims of the Infrastructure is to raise awareness of existing datasets and to facilitate access to them. To this end, the Victorian Spatial Data Directory (VSDD) has been established, and similar directories exist or are being developed in other States and Territories by government and commercial enterprises.

The VSDD is managed by Spatial Information Infrastructure, DSE, and is available to service the needs of custodial organisations. Alternatively, the custodial organisations are able to establish their data directories as “nodes” of the VSDD and / or the Australian Spatial Data Directory (ASDD). The

success of data directories is entirely dependent on data custodians providing metadata that is up to date and conforms to established standards.

7.2 Spatial Information Infrastructure, DSE, will maintain and provide access to the Victorian Spatial Data Directory, and will maintain a list of participating organisations.

Spatial Information Infrastructure, DSE, is the custodian of the Victorian jurisdiction directory and is responsible for developing and maintaining the VSDD. The directory and a list of participating organisations are available on “Land Channel” via <http://www.land.vic.gov.au>.

8 Australian Spatial Data Directory

8.1 All datasets listed in the Victorian Spatial Data Directory will be listed in the ASDD.

The directories in Victoria and in other States and Territories are co-ordinated and linked to form the distributed Australian Spatial Data Directory (ASDD).

The technology being used for the ASDD is an American National Standards Institute search and retrieval protocol (Z39.50) which when combined with the World Wide Web provides a simple method of searching, discovery and retrieval of spatial data.

APPENDIX 1: CHECKLIST FOR CREATING METADATA

The following checklist can be used to help an organisation identify what is needed to create ANZLIC-compliant metadata.

- Decide who will create the metadata or 'catalogue' the resource.
- Decide whether its creation will be centralised or decentralised within the organisation.
- Ensure that appropriate metadata management systems and procedures are in place and are adequately resourced.
- Make sure involved staff are adequately resourced and properly trained, and that they have access to the necessary standards and guidelines and "help" facilities.
- Decide how the metadata is to be stored and how it is to be accessed and displayed.
- Select a metadata entry tool that best meets the organisation's needs.
- Decide on the appropriate level for the individual documentation of resources. The resources should be documented with sufficient "granularity" to yield a useful result when a user discovers the metadata record via a searching mechanism. Too coarse a granularity will result in too generalised result, too fine a granularity is likely to overwhelm the user (not to mention the metadata creator!).
- For each resource, enter the minimum set of metadata elements (elements that are either mandatory or become mandatory under certain conditions, see Appendix 3, Table 1). Completion of this minimum requirement will provide a baseline metadata record that will conform to the Profile.
- ANZLIC has identified additional elements that will enhance the description of geographic datasets, in particular for discovery. This set of metadata, comprising the minimum metadata for geographic datasets and some additional optional elements, is referred to as core metadata for geographic datasets (see Appendix 3, Table 2). ANZLIC strongly recommends completion of the core metadata for geographic datasets.
- In addition to the core, the Profile encompasses a large number of other elements that may be used to describe resources in more detail. Completing these elements can aid a range of uses including evaluation of the resource's fitness for purpose, and enabling applications to discover and transact directly with a resource. ANZLIC encourages completion of as many metadata elements as possible in order to better describe the resource.
- In general, the overall effort put into creating the metadata record for a resource should be consistent with the significance of the resource and with the stage of the resource's "life cycle".
- Carry out agreed quality assurance processes and ensure proof of compliance to the Profile using the validation process specified in the Profile.
- Place the metadata in the agreed store, and ensure that the metadata can be accessed and displayed.
- On an ongoing basis, ensure that the metadata is adequately maintained and kept up to date.

APPENDIX 2: METADATA STANDARDS

The metadata strategy that was first presented in the Victorian Geospatial Information Strategy 2000-2003 (VGIS) was based on the *ANZLIC Metadata Guidelines: Core metadata elements for geographic data in Australia and New Zealand* (version 2, February 2001). Since then, a new International Standard for spatial metadata has been developed and adopted within Australia and New Zealand as *AS/NZS ISO 19115:2005, Geographic information – Metadata*. An associated specification *ISO/TS 19139:2007, Geographic information – Metadata – XML schema implementation* has also been developed to enable the standard to be implemented.

In order to use the new metadata standard, a “profile” of that standard must be made to define what will be included, excluded or added for use by a particular community. Once the new standard was established as a national standard for Australia and New Zealand, organisations began developing their own metadata profiles. In order to harmonise these efforts and ensure a consistent approach to metadata in Australia and New Zealand, ANZLIC established a project to create an Australian/New Zealand metadata profile, which resulted in the document:

“ANZLIC Metadata Profile: An Australian/New Zealand Profile of AS/NZS ISO 19115:2005, *Geographic information — Metadata* (implemented using ISO/TS 19139:2007, *Geographic information — Metadata — XML schema implementation*)”

commonly referred to as ‘the ANZLIC Metadata Profile’ (access via <http://www.anzlic.org.au/metadata/index.html>). The Profile document and a less technical companion document “ANZLIC Metadata Profile Guidelines” replace the earlier ANZLIC Metadata Guidelines (version 2, February 2001) (access via <http://www.anzlic.org.au/publications.html>).

The ANZLIC Metadata Profile defines the appropriate content of metadata for geographic (or spatial) information resources and how this metadata will be implemented throughout Australia and New Zealand. The Profile defines:

- mandatory and conditional metadata sections, metadata entities, and metadata elements
- the *minimum* set of metadata elements for any resource in order to conform to the Profile (as shown in Table 1 of Appendix 3 of these Guidelines)
- the *core* metadata for geographic datasets (as shown in Table 2 of Appendix 3 of these Guidelines)
- *optional* metadata elements that allow for a more extensive standard description of resources
- the option to extend the Profile to cater for specialised needs.

The Profile is intended to facilitate efficient access to descriptions of information resources, and in particular geographic (or spatial) data. It is important to note that, while primarily used to describe digital geographic data, the Profile is not restricted to only describing such resources. Other resources that can be described include maps, charts, textual documents and non-geographic resources.

Widespread use of the Profile will facilitate interoperability within and between organisations and jurisdictions, both within the region and internationally, by providing a consistent basis for communicating information about resources. Implementation of the Profile will:

- provide data producers with appropriate information to consistently record the characteristics of their resources
- facilitate the organisation and management of metadata
- enable users to apply geographic data in the most effective way by knowing their basic characteristics

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- facilitate data discovery, retrieval and re-use: within the context of appropriate digital infrastructure, applications will be able to locate, evaluate, access, and transact resources that have been described with well structured and encoded metadata
- enable users to assess whether a resource is suitable for their intended purpose.

Many existing metadata records and systems comply with ANZLIC's earlier standard. ANZLIC has developed a "mapping" from the metadata elements specified in the ANZLIC Metadata Guidelines (version 2, February 2001) to the elements specified in the ANZLIC Metadata Profile (see ANZLIC web site <http://www.anzlic.org.au> for details). This mapping can be used to transform existing metadata records into the format that complies with the ANZLIC Metadata Profile.

The AGLS (Australian Government Locator Service) metadata standard is based on the relatively simple international Dublin Core metadata standard and is widely used, particularly for non-spatial information and resources. Some organisations are required to produce AGLS metadata for the data resources they manage. As a consequence, there may be a need to transform a metadata description prepared in terms of the ANZLIC Metadata Profile into the AGLS format. In order to allow software transformations and avoid manual editing, care needs to be taken when preparing (and maintaining) a metadata description to ensure that all the necessary ANZLIC Metadata Profile elements are completed and that any additional encoding details are added. ANZLIC provides a mapping between the ANZLIC Metadata Profile and the AGLS standard (see ANZLIC web site <http://www.anzlic.org.au> for details), and it is possible to use this mapping to create AGLS metadata from ANZLIC metadata. However it should be noted that, because the ANZLIC Metadata Profile is more detailed and complex than the AGLS metadata, it is not possible to create ANZLIC – compliant metadata from AGLS metadata records.

APPENDIX 3: ANZLIC METADATA PROFILE

The background to the ANZLIC Metadata Profile and the main features of the Profile are described briefly in earlier sections of this Guidelines document (see Appendix 2).

The following extracts are from section “6 Requirements” of the Profile and are provided in this Appendix for ease of reference, particularly with regard to the core metadata for geographic datasets. The numbering of the extracts is the numbering used in the Profile.

Extracts from ANZLIC Metadata Profile:-

6.1 Metadata for describing geographic data and other resources

The Profile identifies the metadata required to describe digital geographic data and other types of resources. Metadata is applicable to independent datasets, aggregations of datasets, individual geographic features and the various classes of objects that comprise a resource.

Metadata shall be implemented for the Profile by the creation of XML document instances that are validated against the ANZLIC Metadata Profile XSDs, Schematron and relevant code lists and enumerations.

To produce a metadata record that conforms to the Profile a minimum set of metadata elements (elements that are either mandatory or become mandatory under certain conditions) must be completed for both geographic datasets and other resources (see Section 6.3). Completion of this minimum requirement will provide a baseline metadata record that will conform to the Profile.

ANZLIC has identified additional elements that will enhance the description of geographic datasets, in particular for discovery. This set of metadata, comprising the minimum metadata for geographic datasets and some additional optional elements, is referred to as core metadata for geographic datasets (see Section 0). ANZLIC strongly recommends completion of the core metadata for geographic datasets.

In addition to the core, the Profile encompasses a large number of other elements that may be used to describe resources in more detail. Completing these elements can aid a range of uses including evaluation of the resource’s fitness for purpose, and enabling applications to discover and transact directly with a resource. ANZLIC encourages completion of as many metadata elements as possible in order to better describe the resource.

6.2 Obligations/conditions

An obligation/condition is a descriptor indicating whether a metadata entity or metadata element shall always be documented in the metadata or sometimes be documented (i.e. contains value(s)). This descriptor may have the following values: M (mandatory), C

(conditional) or O (optional). The following definitions for these values have been sourced from B.1.5 Obligation/Condition (Annex B, AS/NZS ISO 19115:2005).

A **mandatory (M)** obligation means the metadata entity or metadata element shall be documented.

A **conditional (C)** obligation specifies an electronically manageable condition under which at least one metadata entity or a metadata element is mandatory. 'Conditional' is used for one of the three following possibilities:

- Expressing a choice between two or more options. At least one option is mandatory and must be documented.
- Documenting a metadata entity or a metadata element if another element has been documented.
- Documenting a metadata element if a specific value for another metadata element has been documented.

If the answer to the condition is positive, then the metadata entity or the metadata element shall be mandatory.

An **optional (O)** obligation means that the metadata entity or the metadata element may be documented or may not be documented. Optional metadata entities and optional metadata elements have been defined to provide a guide to those looking to fully document their data. (Use of this common set of defined elements will help promote interoperability among geographic data users and producers world-wide.) If an optional entity is not used, the elements contained within that entity (including mandatory elements) will also not be used. **Optional entities may have mandatory elements; those elements only become mandatory if the optional entity is used.**

6.3 Minimum metadata requirements

The minimum requirements for recording metadata to describe geographic datasets and other resources are those metadata elements that shall be completed in order to conform to the Profile. It should be noted that the obligation for some metadata elements is conditional and only becomes mandatory under certain conditions.

Table 1 identifies the metadata elements that shall be completed for datasets and other resources. Minimum metadata for describing geographic datasets also form part of the core metadata for geographic datasets (see Table 2).

Note that the obligations of some elements are dependent on the stated *hierarchyLevel*.

NOTE The ANZLIC Metadata Profile imposes a more stringent obligation for the metadata element *fileIdentifier* than the AS/NZS ISO 19115:2005. The obligation was made mandatory to assist with implementation of the Profile.

Table 1 - Minimum for geographic datasets and other resources

Name	Path	Datasets	Other resources
Metadata file identifier	MD_Metadata.fileIdentifier	M	M
Metadata language	MD_Metadata.language	C ^a	C ^a
Metadata character set	MD_Metadata.characterSet	C ^b	C ^b
Metadata file parent identifier	MD_Metadata.parentIdentifier	C ^c	C ^c
Metadata hierarchy level	MD_Metadata.hierarchyLevel	O ^d	M ^e
Metadata hierarchy level name	MD_Metadata.hierarchyLevelName	O ^f	M ^{e, g}
Metadata contact individual name	MD_Metadata.contact > CI_ResponsibleParty.individualName	C ^h	C ^h
Metadata contact organisation	MD_Metadata.contact > CI_ResponsibleParty.organisationName	C ⁱ	C ⁱ
Metadata contact position	MD_Metadata.contact > CI_ResponsibleParty.positionName	C ^j	C ^j
Metadata contact role	MD_Metadata.contact > CI_ResponsibleParty.role > CI_RoleCode	M	M
Metadata date stamp	MD_Metadata.dateStamp	M	M
Resource title	MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.title	M	M ^k
Resource reference date	MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.date > CI_Date.date	M	M ^k
Resource reference date type	MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.date > CI_Date.dateType > CI_DateTypeCode	M	M ^k
Abstract describing the resource	MD_Metadata.identificationInfo > MD_DataIdentification.abstract	M	M ^k
Resource language	MD_Metadata.identificationInfo > MD_DataIdentification.language	M	C ^l
Resource character set	MD_Metadata.identificationInfo > MD_DataIdentification.characterSet	C ^m	C ^m
Topic category	MD_Metadata.identificationInfo > MD_DataIdentification.topicCategory	M	C ⁿ

Name	Path	Datasets	Other resources
Geographic location of the resource (by description)	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicDescription.geographicIdentifier > MD_Identifier.code	C ^{o,p}	O ^p
West longitude	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicBoundingBox.westBoundLongitude	C ^{o,p}	O ^p
East longitude	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicBoundingBox.eastBoundLongitude	C ^{o,p}	O ^p
South latitude	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicBoundingBox.southBoundLatitude	C ^{o,p}	O ^p
North latitude	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicBoundingBox.northBoundLatitude	C ^{o,p}	O ^p

- a language: documented if not defined by the encoding process
- b characterSet: documented if ISO 10646-1, *Information technology — Universal Multiple-Octet Coded Character Set (UCS)* is not used and not defined by the encoding process
- c parentIdentifier: documented if the hierarchy of a higher level exists
- d hierarchyLevel: assumed to be 'dataset' if MD_Metadata.hierarchyLevel is omitted
- e hierarchyLevel: documented if hierarchyLevel not = 'dataset'
- f hierarchyLevelName: assumed to be 'dataset' if MD_Metadata.hierarchyLevelName is omitted
- g hierarchyLevelName: documented if hierarchyLevel not = 'dataset'
- h individualName: documented if 'organisationName' and 'positionName' not documented
- i organisationName: documented if 'individualName' and 'positionName' not documented
- j positionName: documented if 'individualName' and 'organisationName' not documented
- k MD_ServiceIdentification may be used instead of MD_DataIdentification if hierarchyLevel = 'service'
- l only used if MD_DataIdentification has been used
- m characterSet: documented if ISO 10646-1 is not used
- n topicCategory: if hierarchyLevel = 'series' topicCategory is mandatory
- o for a geographic dataset, include metadata for the geographic bounding box (West longitude, East longitude, South latitude and North latitude) or the geographic description identifier (ANZLIC prefers the use of geographic bounding box — see Section 6.5.3)
- p if any one of west longitude, east longitude, south latitude or north latitude exists, then the remaining three must also be completed

6.4 Core metadata for datasets

AS/NZS ISO 19115:2005 defines an extensive set of metadata elements; though typically only a subset of the full number of elements is used. It is essential that a minimum number of metadata elements be maintained for a dataset (Table 1); however, when describing geographic datasets, ANZLIC recommends the use of metadata in addition to the minimum requirements for geographic datasets. This set of metadata, which includes the minimum set of metadata and some additional optional elements, is referred to as core metadata. Table 2

lists the core metadata required to describe a dataset, typically for catalogue purposes. This list contains metadata answering the following questions:

- 'Does a dataset on a specific topic exist ("what")?'
- 'For a specific place ("where")?'
- 'For a specific date or period ("when")?'
- 'A point of contact to learn more about or order the dataset ("who")?'

By using the core metadata recommended in the Profile interoperability will be enhanced, allowing users to understand without ambiguity the geographic data and the related metadata provided by either the producer or the distributor. Additional metadata elements provided by either the producer or the distributor also allow users to more clearly evaluate the characteristics of geographic datasets.

Table 2 — Core metadata for geographic datasets

Name	Path	Obligation
Metadata file identifier	MD_Metadata.fileIdentifier	M ^a
Metadata language	MD_Metadata.language	C ^b
Metadata character set	MD_Metadata.characterSet	C ^c
Metadata file parent identifier	MD_Metadata.parentIdentifier	C ^d
Metadata point of contact	MD_Metadata.contact > CI_ResponsibleParty	M
Metadata date stamp	MD_Metadata.dateStamp	M
Metadata standard name	MD_Metadata.metadataStandardName	O
Metadata standard version	MD_Metadata.metadataStandardVersion	O
Dataset title	MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.title	M
Dataset reference date	MD_Metadata.identificationInfo > MD_DataIdentification.citation > CI_Citation.date	M
Abstract describing the data	MD_Metadata.identificationInfo > MD_DataIdentification.abstract	M
Dataset responsible party	MD_Metadata.identificationInfo > MD_DataIdentification.pointOfContact > CI_ResponsibleParty	O
Spatial representation type	MD_Metadata.identificationInfo > MD_DataIdentification.spatialRepresentationType	O
Spatial resolution of the dataset	MD_Metadata.identificationInfo > MD_DataIdentification.spatialResolution > MD_Resolution.distance or MD_Resolution.equivalentScale	O ^e

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Name	Path	Obligation
Dataset language	MD_Metadata.identificationInfo > MD_DataIdentification.language	M
Dataset character set	MD_Metadata.identificationInfo > MD_DataIdentification.characterSet	C ^f
Dataset topic category	MD_Metadata.identificationInfo > MD_DataIdentification.topicCategory	M
Geographic location of the dataset (by four coordinates or by description)	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent > EX_GeographicBoundingBox or EX_GeographicDescription	C ^{g, h}
Temporal extent information for the dataset	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.temporalElement	O
Vertical extent information for the dataset	MD_Metadata.identificationInfo > MD_DataIdentification.extent > EX_Extent.verticalElement > EX_VerticalExtent	O
Lineage	MD_Metadata.dataQualityInfo > DQ_DataQuality.lineage > LI_Lineage	O
Reference system	MD_Metadata.referenceSystemInfo > MD_ReferenceSystem.referenceSystemIdentifier > RS_Identifier	O
Distribution Format	MD_Metadata.distributionInfo > MD_Distribution > MD_Format	O
On-line resource	MD_Metadata.distributionInfo > MD_Distribution > MD_DigitalTransferOption.onLine > CI_OnlineResource	O

- a the Profile imposes a mandatory obligation on the metadata element fileIdentifier
- b language: documented if not defined by the encoding process
- c characterSet: documented if ISO 10646-1, *Information technology — Universal Multiple-Octet Coded Character Set (UCS)* is not used and not defined by the encoding process
- d documented if a higher level of hierarchy level exists (e.g. if the geographic 'dataset' is part of a 'series')
- e distance is preferred over equivalentScale because the scale will change when presented at different sizes on a screen
- f characterSet: documented if ISO 10646-1 is not used
- g include either the geographic bounding box (extents) or the geographic description (ANZLIC prefers the use of geographic bounding box — see Section 6.5.3)
- h if any one of west longitude, east longitude, south latitude or north latitude exists, then the remaining three must also be completed

Source: Adapted from Table 3 — *Core metadata for geographic datasets* (AS/NZS ISO 19115:2005).

APPENDIX 4: ANZLIC “PAGE 0” METADATA ELEMENTS

Prior to the development of the International Standard ISO 19115, ANZLIC had developed guidelines that were designed for use by data custodians to assist them in their work of creating, storing and distributing core metadata elements. Among other things, the guidelines were intended to be applied to the collection of geospatial metadata that was to be used in the Australian Spatial Data Directory.

The Guidelines were published in different versions, the most recent being “ANZLIC Metadata Guidelines: Core metadata elements for spatial data in Australia and New Zealand Version 2 (February 2001)”. The Guidelines are now superseded by the ANZLIC Metadata Profile (version 1.1, August 2007). However, many existing metadata records and systems comply with the earlier standard. Hence, it is expected that it will take some time before the ANZLIC Metadata Profile is fully implemented and the earlier standard can be totally discarded. To assist with the transition, ANZLIC has developed a “mapping” from the metadata elements specified in the ANZLIC Metadata Guidelines (version 2, February 2001) to the elements specified in the ANZLIC Metadata Profile (see ANZLIC web site <http://www.anzlic.org.au> for details). This mapping can be used to transform existing metadata records into the format that complies with the ANZLIC Metadata Profile

The ANZLIC Guidelines defined a small number of core “Page 0” metadata elements that ANZLIC believed should be recorded for all spatial data. A summary description of the ANZLIC core metadata elements is given in Table 1 below which has been extracted from the Guidelines for ease of reference. For each of the core metadata elements, Table 1 describes the following characteristics:

- **Category** Name of the category (see Section 3.1 and Table 1 above) in which the metadata element is grouped.
- **Element** Name of the element.
- **Definition of Element** A short explanation of the purpose of the element including any important issues that should be addressed when completing the element.
- **Obligation (Obln)** An element may be Mandatory (M), Optional (O) or Conditional (C). Mandatory requires an element to be completed whilst optional means the element may be left blank. Conditional means completion of the element may become mandatory if another element is completed. For instance, GEN Category must be completed if either GEN Custodial Jurisdiction or the GEN name is completed. In other instances it may be left blank.
- **Maximum Occurrence (Max Occ)** The number of times that an element may be repeated. The repeatability of an element is defined in relationship to its parent. For instance, a metadata record may have many Contact Organisations associated with it even though each Contact metadata record may have only one Contact Organisation.
- **Field:** A combination of “Field Type” and “Length of Field”. Field Type is the data type that is applicable to the metadata element. Field Types include Text and Signed Real Number. Length of Field is the length of the data type.

Further details and explanations of these characteristics and of the elements and their use are given in the ANZLIC Guidelines.

Table 1: A summary of the ANZLIC Core Metadata Elements

Category	Element	Definition of Element	ObIn	Max Occ	Field
Dataset	ANZLIC Identifier	The unique identifier given to the dataset by ANZLIC.	M	1	Text(15)
	Title	The ordinary name of the dataset.	M	1	Text(160)
Custodian	Custodian	The business name of the custodial organisation or responsible party associated with the dataset.	M	1	Text(120)
	Jurisdiction	The state or country in which the Custodian of the dataset is domiciled.	M	1	Text(30)
Description	Abstract	A brief narrative summary of the content of the dataset.	M	1	Text(2000)
	Search Word	Words likely to be used by a non-expert to find the dataset.	M	N	Text(60)
	Geographic Extent Name	The ordinary name of one or more pre-defined, known geographic objects that reasonably show the extent of geographic coverage of the dataset. This element is usually implemented as three discrete elements as listed below	O	N	
	GEN Category	Category to which the Geographic Extent Name belongs including map series, local government area, and drainage divisions and major river basins.	C	1 ¹	Text(80)
	GEN Custodial Jurisdiction	Country, state or territory that is responsible for maintaining the detail of the geographic object	C	1 ¹	Text(30)
	GEN Name	Name of the geographic object.	C	1 ¹	Text(80)
	Geographic Extent Polygon	Boundary enclosing the dataset expressed as a closed set of geographic coordinates (latitude, longitude) of the polygon referenced to GDA94. This is an alternate way of describing geographic extent of the dataset if no pre-defined area is satisfactory.	O	N	Text(1000)
	Geographic Bounding Box	A rectangle defining the minimum and maximum coordinates of the entire data. This element is implemented as four discrete elements as listed below.	M	1	
	North Bounding Latitude	Northern-most coordinate of the limit of the dataset expressed in latitude, in decimal degrees.	M	1	Signed Real Number
	South Bounding Latitude	Southern-most coordinate of the limit of the dataset expressed in latitude, in decimal degrees.	M	1	Signed Real Number
	East Bounding Longitude	Eastern-most coordinate of the limit of the dataset expressed in longitude, in decimal degrees	M	1	Signed Real Number
	West Bounding Longitude	Western-most coordinate of the limit of the dataset expressed in longitude, in decimal degrees.	M	1	Signed Real Number

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Data Currency	Beginning date	Earliest date at which the phenomena in the dataset actually occurred.	M	1	Text(10)
	Ending date	Latest date at which the phenomena in the dataset actually occurred.	M	1	Text(10)
Dataset Status	Progress	The status of the process of creation of the dataset.	M	1	Text(20)
	Maintenance and Update Frequency	Frequency of changes or additions that are made to the dataset after its initial completion.	M	1	Text(20)
Access	Stored Data Format	The format in which the dataset is stored by the custodian.	M	1	Text(500)
	Available Format Type	The format in which the dataset is available.	O	N	Text(240)
	Access Constraint	Any restrictions or legal prerequisites that may apply to the access and use of the dataset including licensing, liability and copyright.	M	1	Text(500)
Data Quality	Lineage	A brief history of the source and processing steps used to produce the dataset.	M	1	Text(4000)
	Positional Accuracy	A brief assessment of the closeness of the location of spatial objects in the dataset in relation to their true position on the Earth.	M	1	Text(4000)
	Attribute Accuracy	A brief assessment of the reliability assigned to features in the dataset in relation to their real world values.	M	1	Text(4000)
	Logical Consistency	A brief assessment of the degree of adherence of logical rules of data structure, attribution and relationships. Data structure can be conceptual, logical or physical.	M	1	Text(4000)
	Completeness	A brief assessment of the extent and range in regard to completeness of coverage, completeness of classification and completeness of verification.	M	1	Text(4000)
Contact Information	Contact Organisation	Name of the organisation from which the dataset may be obtained.	M	1 ²	Text(120)
	Contact Position	The position in the Contact Organisation that will answer questions about the dataset.	M	1 ²	Text(40)
	Mail Address	Postal address or delivery point of the Contact Position.	M	2 ²	Text(40)
	Locality	Locality associated with the Mail Address.	M	1 ²	Text(60)
	State	Aust: State associated with the Mail Address NZ: Optional extension for Locality.	M	1 ²	Text(40)
	Country	Country associated with the Mail Address.	M	1 ²	Text(40)
	Postcode	Aust: Postcode associated the Mail Address. NZ: Optional postcode for mail sorting.	M	1 ²	Text(10)

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	Telephone	Telephone number of the Contact Position.	O	1 ²	Text(25)
	Facsimile	Facsimile number of the Contact Position.	O	1 ²	Text(25)
	Electronic Mail Address	Electronic Mail Address of the Contact Position.	O	1 ²	Text(80)
Metadata Date	Metadata Date	Date on which the metadata record was created or modified.	M	1	Text(10)
Additional Metadata	Additional Metadata	Any additional metadata that supports documentation of the dataset including a reference to another directory or report.	O	1	Text(4000)

¹ Dependent upon the repeatability of the parent element.

² Number of occurrences associated with each contact – a dataset may have many contacts

APPENDIX 5 GLOSSARY OF TERMS

Access infrastructure	The way in which spatial information may be located and accessed. It broadly includes the policy framework, the physical network infrastructure and the spatial industry marketplace.
AGLS metadata	AGLS (Australian Government Locator Service) metadata standard is based on the relatively simple international Dublin Core metadata standard and is widely used particularly for non-spatial information and resources.
AS/NZS ISO Standard on Metadata	AS/NZS ISO 19115:2005, Geographic information – Metadata defines the schema required for describing spatial information and services.
ANZLIC Metadata Profile	A profile of a standard defines what will be included, excluded or added for use by a particular community. The ANZLIC Metadata Profile defines how the AS/NZS standard on metadata will be used in Australia and New Zealand. By definition, conformance to the Profile is conformance to Standard.
Custodian	The entity responsible for a data set. That is, the organisation formally responsible for ensuring accuracy, currency, storage, security, and distribution of the data. The custodian need not be directly involved in maintaining or supplying the data, but should be in a position to direct such activities.
Data	The base level of information stored in electronic or other databases. Data can exist in many formats including digital data, imagery such as aerial photographs and satellite images, and hardcopy products such as maps or plans.
Data product	Dataset that conforms to a data product specification.
Data product specification	Detailed description of a dataset that will enable it to be created, supplied to and used by another party.
Dataset	Identifiable collection of data.
Information	The result of manipulating, analysing and interpreting data to produce a result which adds value or utility to the original data
Metadata	Data about data. Metadata is structured data which describes the characteristics of information, services or other resources.
Metadata element	Discrete unit of metadata
Metadata entity	Set of metadata elements describing the same aspect of data
Schematron	Tool used in implementing the ANZLIC Metadata Profile by processing AS/NZS ISO 19115 conditional statements.
Spatial Data Infrastructure (SDI)	The technologies, policies and institutional arrangements that facilitate the availability of and access to spatial data.
Victorian Spatial Data Directory (VSDD)	The directory of metadata that describes data sets that originate or may be of use in Victoria. It is a public resource available on the Internet. It includes both current and archived data.
Victorian Spatial Council (VSC)	The body chartered with overseeing and coordinating the implementation of VSIS across the State.

Web services	Software applications that share information with other applications to provide services based on the combination of them all. Entry is via one application that draws the information contained in the other applications together, whether from the same or different servers.
XSD (XML Schema Definition)	An XML-based language used to describe and control XML document contents. XSD is used to validate metadata records and prove compliance with the ANZLIC Metadata Profile.